

IN THE CLAIMS

Please amend the claims to read as follows:

Listing of Claims

Claims 1-32 (Cancelled).

33. (Currently Amended) A medium access control system in a wireless network, comprising:

~~An an access point that communicates with one or more stations spaced apart in a reception space in a medium access control system in a wireless network, and that is~~ equipped with a space division multiple access (SDMA) compatible multi-beam antenna and a plurality of transceivers that can respectively be simultaneously connected to different antenna beams and transmit data using a superframe, ~~and wherein:~~

one or more stations spaced apart in a reception space of a wireless local area network (LAN),

wherein the superframe has a timing structure comprising:

(i) a periodically transmitted beacon frame transmitted by the access point that reports existence of a wireless network and provides a timing reference to each station on the network;

(ii) a supervised access mode that is a period in which the access point multi-beam an antenna is configured in a directional pattern, the access point controls access to a wireless channel ~~is controlled~~ and adjusts transmission with a plurality of stations by utilizing multi-beam

~~antenna characteristics is adjusted~~ such that simultaneous transmissions with the plurality of stations can be implemented on a same wireless channel, and each station follows predetermined rules defined by the access point or by a network coordinator;

(iii) an unsupervised access mode that is a period in which the access point multi-beam antenna is configured in an omni-directional pattern, and each station executes rule-free, contention-based access to a wireless channel; and

(iv) signaling whereby the access point starts or terminates the supervised access mode or the unsupervised access mode is ~~started or terminated~~, wherein:

the beacon frame provides each station with the multi-beam antenna characteristics an ~~antenna-type~~ of a directional pattern ~~dynamic beam~~ or omni-directional pattern ~~fixed beam~~;

when the multi-beam antenna characteristic is the directional pattern ~~antenna-type is the dynamic beam~~, the unsupervised access mode is executed in order to detect a new station in the reception space; and

when the multi-beam antenna characteristic is the omni-directional pattern ~~antenna-type is the fixed beam~~, the unsupervised access mode is executed in a case where a rogue station is detected in the reception space.

Claim 34 (Cancelled).

35. (Currently Amended) The system ~~access point~~ according to claim 33, further including a protocol stack comprising:

(i) a medium access control layer that defines an access rule whereby a plurality of wireless stations access a common medium;

(ii) a physical layer that performs actual data transmission and reception on a wireless channel; and

(iii) a management entity that manages and adjusts operation of said medium access control layer and said physical layer in order to improve overall wireless network throughput.

36. (Currently Amended) The system access point according to claim 35, wherein said medium access control layer comprises:

(i) a contention based access mechanism whereby a carrier sensing mechanism is used and stations compete for a transmission medium based on one set of rules;

(ii) a polling based channel access mechanism whereby an access point can satisfy a band request of a specific station while maintaining a service quality level specified beforehand by that station; and

(iii) a beam access coordinator that implements high throughput by adjusting data transfer between antennas and an access point and utilizing a function of a multi beam antenna using said contention based and said polling based access mechanisms.

37. (Currently Amended) The system access point according to claim 33, wherein said beacon frame described is broadcast by an access point, and has a function that reports existence of a WLAN and provides a timing reference to stations scattered on a network, and comprises:

(i) an identifier unique to said wireless network whereby each station can uniquely and explicitly identify an access point and therefore a specific network;

(ii) a wireless network function and protocol related information specially defined by implementation of an access point;

(iii) information describing a used frequency of a beacon broadcast by an access point on a wireless network; and

(iv) a period in which a wireless network operates in the supervised access mode, and whereby a conventional station does not execute association or transmission in the superframe period, as a result of which effects on wireless network throughput due to such transmissions/collisions are minimized.

38. (Currently Amended) The system access point according to claim 37, wherein said wireless network function and protocol related information comprises:

(i) a protocol reference number that enables a station's medium access control protocol type to be confirmed;

(ii) antenna type and pattern;

(iii) antenna switching/operating functions; and

(iv) station direction finding/positioning functions.

Claim 39. (Cancelled)

40. (Currently Amended) The system access point according to claim 33 that, wherein the access point, in response to said Association Request frame, transmits an Association Response frame request that accepts or denies a request of each station, and comprises information elements described in following (i), (iv), and (v), and further comprises information elements described in (ii) and (iii) according to a network configuration, said access point and station functions, and a structure of a transmitted Association Request:

(i) a wireless network identifier for acknowledging and responding to an Association Request created by a station;

(ii) a group identifier of a beam group used by an access point for communication with that station;

(iii) a beam identifier of a beam used by an access point for communication with that station;

(iv) an address of a station itself that is an Association Response transmission destination; and

(v) information relating to request status (that is, success or failure) and characteristics and functions supported by an access point.

41. (Currently Amended) The system access point according to claim 33, wherein the access point that transmits an Acquisition Request that requests transmission of a predetermined training sequence to a station for a certain period, and identifies a spatial location of that station with respect to itself using that transmission, said Acquisition Request comprising:

(i) an address of a station that makes an Acquisition Request;

(ii) an address of a station that is an Acquisition Request transmission destination; and

(iii) transmission period or length of a training sequence requested in order to transmit an address to a specified station.

42. (Currently Amended) The system access point according to claim 33, wherein the access point that transmits to a station a group ID assignment (Group ID Assign) frame that

performs assignment to a specific beam group for further transmit/receive operations, said Group ID Assign frame comprising:

- (i) an access point address/WLAN ID;
- (ii) an address of a station that is a transmission destination of said Group ID Assign frame;
- (iii) a group ID determined by an access point and assigned to a station whose address was specified; and
- (iv) a beam identifier of a beam used by an access point in a next communication with a station whose address was specified.

43. (Currently Amended) The system ~~access point~~ according to claim 33, wherein the access point that broadcasts to each station of a specific beam group a Beam Start Beacon frame that indicates a start of operation to users of that beam group, said Beam Start Beacon frame comprising:

- (i) an access point address/WLAN ID enabling identification of a transmission source for each station;
- (ii) information relating to wireless network functions and protocol;
- (iii) a group ID of said beam;
- (iv) a beam ID of said beam;
- (v) a period in which said group is active that is, a period in which an access point performs transmission/reception with users of said group before switching to a different pattern in order to handle users of another group;

(vi) a frequency for transmitting a Beam Start Beacon that makes it possible for stations of said group and beam to achieve mutual synchronization; and

(vii) a schedule of outbound transmissions created by an access point in a current group period.

44. (Currently Amended) The ~~system access point~~ according to claim 33, wherein the access point that broadcasts to each station of a specific beam group a Beam End Beacon that indicates termination of operation to users of that beam group, said Beam End Beacon comprising:

(i) an access point address/WLAN ID enabling identification of a transmission source for each station;

(ii) information relating to wireless network functions and protocol;

(iii) a group ID of said beam;

(iv) a beam ID of said beam; and

(v) a period in which said group is inactive, and said users can adopt an operating mode that facilitates a reduction in power consumption.

45. (Currently Amended) The ~~system access point~~ according to claim 33, wherein the access point that transmits to each station of a specific beam a Poll+Supervised Contention Announcement frame that defines a wireless medium polling based medium access and contention based access schedule, said Poll+Supervised Contention Announcement frame comprising:

(i) a polling list assigned to respective stations; and

(ii) an information element that declares a medium for uplink contention based access use of a specified period known as a supervised contention access period.

46. (Currently Amended) The system access point according to claim 45, wherein said polling list comprises:

- (i) an address of a station for which polling based access is permitted;
- (ii) a polling time that is, a time when a station can start transmission;
- (iii) a polling period that is, a period for which a station can execute transmission; and
- (iv) a purpose of polling or permission for indicating to a station that polling is for a stream that requested a band beforehand, or to request reception confirmation for a downlink frame transmitted in the past.

47. (Currently Amended) The system access point according to claim 33, wherein the access point ~~that~~ uses an SDMA compatible antenna capable of forming a sector shaped beam, characterized by:

- (i) comparatively stable gain in a passband that minimizes fluctuation of a reception power level for a user belonging to that beam; and
- (ii) sharp roll off that is, a narrow transition width such that a beam is generated at short intervals by an access point by suppressing occurrence of interference due to transmission from a particular beam to a user of a different beam, spectral efficiency is increased, and consequently high throughput is obtained.

Claim 48. (Cancelled)

49. (Currently Amended) The system access point according to claim 43, wherein a downlink schedule element of said Beam Start Beacon:

(i) shows an outbound transmission schedule composed of a transmission destination address, transmission length, and time at which said transmission is performed; and

(ii) shows an end of an outbound transmission schedule that is, a transmission time corresponding to a Poll+Supervised Contention Announcement frame and enables a station that is not scheduled to receive an outbound transmission in a given group period to execute power saving in a downlink period of that group period.

50. (Withdrawn) A medium access control method in a wireless network that has stations and an access point, wherein, in order to minimize collisions due to a rogue station that uses carrier sensing not in accordance with a protocol of a WLAN system, said medium access control method comprises:

(i) a step of transmitting dummy or pad data and equalizing transmission times in all beams, preventing a station that uses a rogue carrier sensing method from detecting a vacant medium, and as a result avoiding transmission from a rogue station, thereby eliminating variance of outbound transmission times by different beams of a given group; and

(ii) a step of each station polled with the object of a confirmation response in an uplink phase transmitting a confirmation response frame indicating a negative response that is, each station ignoring a confirmation response request thereby not permitting a gap exceeding a CIFS period in a transmission structure.

51. (Withdrawn) A medium access control method in a wireless network that has stations and an access point, wherein, in order to detect and handle existence of a rogue station in a wireless network, said medium access control method comprises:

(i) a step of detecting that there is a rogue station if observing that transmission ended in failure in all beams at a same time; and

(ii) a step of, in case of detection of existence of said rogue station, switching to unsupervised access mode and directing that rogue station to transfer to another channel.